

AGRICULTURE

Project Fact Sheet



PRECISION IRRIGATION FOR THE AGRICULTURAL INDUSTRY

Benefits

- Offers potential for annual nationwide energy savings of 108 million kWh, with 10 to 15 percent of irrigable crop land using the Accu-Pulse system
- Lowers energy use up to 95 percent, while eliminating emissions from airplane and ground transportation currently used to apply chemicals to crop land
- Saves approximately 10 pounds of nitrogen for every inch of water used
- Offers potential for annual water savings of 160 billion gallons with 10 to 15 percent of irrigable crop land using the Accu-Pulse system
- Potential to yield economic savings of \$55 per acre per year by eliminating airplane and motor vehicle distribution of chemicals

Applications

Farmers and producers who use self-propelled center pivot or linear irrigation sprinkler systems will benefit from the Accu-Pulse technology. The new system will also assist agricultural consultants and advisors.

Project Partners

Baucke-Jones Farms
Yuma, CO

Colorado Corn Administrative
Committee
Lakewood, CO

Colorado Office of Energy
Management
Denver, CO

Robert Geisick
Wiggins, CO

NICE³ Program
Washington, DC

Valmont Industries
Omaha, NE

INNOVATIVE SYSTEM ALLOWS SITE-SPECIFIC IRRIGATION TO MAXIMIZE CROP PRODUCTION AND LOWER ENERGY AND WATER USE

The Colorado Corn Administrative Committee and its partners are demonstrating and commercializing a novel irrigation system that increases crop yields while using less water, fewer chemicals, and less energy. The new technology offers site-specific irrigation, successfully applying the right amount of water, fertilizer, or other chemicals to specific sub-areas within the space covered by an irrigation pivot. This kind of precision previously eluded farmers who have had to treat agricultural fields as a singular unit, even though soil moisture, weed and pest populations, salinity, or vegetation quality can differ from one sub-area to another. As a result, water and chemicals have often been overused.

The Accu-Pulse irrigation system uses satellite photo data to reduce the cost of applying pesticides or other chemicals to crops. Once problem areas are identified, the new system integrates the appropriate amount of chemicals to be applied with irrigation water. Savings of up to 95 percent can be realized for growers who have traditionally used air or ground transportation to apply the chemicals. This can amount to annual savings of up to \$55 per acre.

CENTER PIVOT IRRIGATION SYSTEM



Accu-Pulse computer software, which uses global satellite photography data to determine appropriate water and chemical levels necessary within specific crop land sub-areas, can be used with self-propelled linear move and center pivot irrigation systems.



Project Description

Goal: Develop commercial access to Accu-Pulse so farmers have precise information about conditions throughout their fields. The energy, water, and chemical-saving system will create management zone maps and control water and chemical applications in small sections within irrigation pivots.

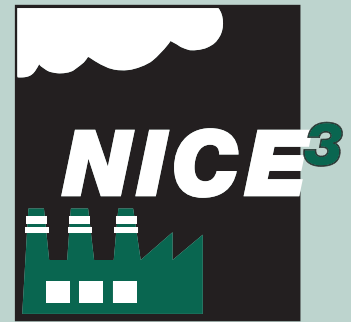
This site-specific system uses global positioning satellite (GPS) photography data to determine soil moisture and nutrients, insect infestation, and vegetation content in sub-areas within crop land. This information is then analyzed by computer software that determines how much water, fertilizer, or other chemicals should be applied to specific areas within a field.

Accu-Pulse is a low volume application system, mounted on self-propelled irrigation systems, either center pivot or linear move. Plastic nozzles are spaced at five feet intervals along a cable strung under the mainline. Each nozzle contains a two-way valve that directs flow either into an accumulator chamber and the downstream tubing or into the spray orifice. This unique system applies solutions in quick pulses when line pressure is momentarily released. The amount of solution applied can be varied by changing the frequency of the pulses, the volume of solution stored in the accumulator chamber, or the travel speed of the machine.

The Colorado Corn Administrative Committee is demonstrating this new technology with assistance from Baucke-Jones Farms, the Colorado Office of Energy Management, Valmont Industries, and the NICE³ Program in the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

- Initial software and documentation developed with ongoing optimization planned.
- Equipment installed January 2001.
- Field assessment and evaluation initiated in July 2000 and continuing through November 2003.
- Production-scale commercial demonstration and variable treatment application ongoing from June 2001 until November 2003.
- Web site development and maintenance initiated in March 2001.
- Multimedia kiosk, video presentation, and brochure being developed and distributed through 2003.



NICE³ – National Industrial Competitiveness through Energy, Environment, and Economics:
An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to \$525,000. Grants fund up to 50% of total project cost for up to 3 years.

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